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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,359	10/30/2003	Christopher C. Painter	UC1.PAU.25	7903

7590 01/18/2005

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EXAMINER	
HANLEY, JOHN C	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 01/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/697,359	PAINTER ET AL.	
	Examiner	Art Unit	
	John C Hanley	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 01 March 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Regarding claims 1 and 16, it is unclear what is meant by "measures a full angle of angular motion".

4. Regarding claims 2 and 17, "without interfere(sic) with the measured precession pattern of the slave mass" is structurally indefinite. This negative limitation does not structurally define an element that would prevent interference and, assuming interference cannot be 100% eliminated by any structure, it is indefinite as to the bounds of interference. Further, the measured precession pattern in this clause does not have any antecedent basis.

5. Regarding claims 4 and 19 "substantially decoupled" is indefinite and unclear as to how it further limits, since decoupling is one of degree that is not specified, and the parent claims specifically recite that the drive and slave masses are mechanically coupled.

6. Regarding claims 5 and 20, there is no antecedent basis for the first slave mass deflection peak.

7. Regarding claims 7, 8, 22 and 23 are "defined by the layout geometry of the gyroscope" is vague and indefinite. The layout geometry has no antecedent basis, it is unclear what it is, and it is unclear how it defines.

8. Regarding claims 14 and 29, "maintaining the motion of the slave mass at a constant energy state by injecting additional energy" is unclear why additional energy is needed to maintain, where it is already maintained by the energy in claims 13 and 28, respectively.

9. Regarding claims 15 and 30, "without interfering with a Coriolis induced precession pattern of the slave mass" is a vague and indefinite negative limitation for similar reasons as set forth in paragraph 4, above.

10. Further regarding claim 17, it is unclear how the sense electrodes would be controlled.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shkel et al (US-6481285) in view of Dyck et al (US-6393913).

13. Shkel et al shows an angle measuring gyroscope having a substrate having a first surface, a movable mass coupled to the substrate, two sets of orthogonal drive electrodes coupled to the mass and defined in a plane above the substrate, and two sets of orthogonal sense electrodes coupled to the mass and defined in the same plane as the drive electrodes. Control means are coupled to the sense electrodes and the drive electrodes to drive the mass at a constant amplitude at a first resonant frequency. The control means generates an output position and velocity signal of the mass and feeds back

the output position and velocity signal to generate a control signal applied to drive the mass at a constant energy state. Shkel et al lacks only a separate drive mass and slave mass, and the details of their relationship, because in Shkel et al, the drive and slave masses are the same mass.

14. However, Dyck et al teaches to use a separate drive mass and slave mass. The drive mass is driven in a linear region, while the motion of the drive mass is coupled to the slave mass to amplify the motion of the drive mass to the slave mass to increase sensitivity. The drive mass can be in a window in the slave mass so that the slave mass surrounds the drive mass, or the positions can be reversed. Drive electrodes 26 are positioned in a window of the drive mass. The extent of motion of the slave mass can be larger than the extent of motion of the drive mass upon actuation of the first mass. The actuating voltage can be reduced while still providing an increased motion of the slave mass compared to the motion of the drive mass. This provides an increased sensitivity for position sensing of the device while reducing an electrical noise level of the device. Several modes of operation are taught, including a resonant mode at a first eigenfrequency where maximum deflection peak occurs in the slave mass, and an antiresonant mode, where greatest dynamic amplification is achieved.

15. It would have been obvious to modify the single drive/slave mass structure of Shkel et al with the dual mass structure of Dyck et al to increase the sensitivity of the device of Shkel et al while reducing the drive requirements and noise, where such motivation is expressly indicated in Dyck et al. In making this substitution, it would have been further obvious to associate the drive electrodes with the drive mass and the sense electrodes with the sense mass. In doing so, one skilled in the art would obviously space the electrodes accordingly, so it would have been obvious

that greater spacing would be required for the sense electrodes, since the sense mass requires higher deflection amplitudes. It would have been further obvious to place the sense electrodes in a window in the sense mass in the same manner shown in Dyck et al with respect to the drive mass, to provide a more compact structure, as taught in Dyck et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C Hanley whose telephone number is 571-272-2195. The examiner can normally be reached on M-F 9AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JCH

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